

3. An undulated-wall honeycomb structure according to
either ~~Claim 1 or 2~~ Claim 1, wherein said wall face portions
formed with an undulated shape and wall face portions formed
with a flat shape are formed in an intermingled fashion.

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4. An undulated-wall honeycomb structure according to
~~any of the Claims 1 through 3~~, wherein, Claim 1, regarding
each of said cell passages, at least one of said plurality
of walls making up said cell passage is formed with an
undulated shape.

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5. An undulated-wall honeycomb structure according to
~~any of the Claims 1 through 4~~ Claim 1, wherein the undulated
deformation whereby said walls are formed with an undulated
shape is greater at the outer portion than at the center
portion.

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6. An undulated-wall honeycomb structure according to
~~any of the Claims 1 through 5~~ Claim 1, wherein the amplitude
of the undulated deformation of walls are formed with an
undulated shape is 150% of the thickness of said walls or
more.

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7. An undulated-wall honeycomb structure according to
~~any of the Claims 1 through 6~~ Claim 1, wherein a line

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connecting the highest portions of the protrusions and/or the lowest portions of the recessions of the wall face portions formed with an undulated shape in said cell passage direction repeats a pattern of turning in the vertical direction to said cell passage direction on said wall face.

8. An undulated-wall honeycomb structure according to ~~any of the Claims 1 through 7~~ Claim 3, wherein cell passages formed by said wall face portions of said walls formed in an undulated shape and cell passages formed by said wall face portions of said walls formed in a flat shape appear and coexist in a discontinuous manner.

9. An undulated-wall honeycomb structure according to ~~any of the Claims 1 through 8~~ Claim 3, comprising a cell passage area A formed with a generally circular cross-section from the center, and a cell passage area B formed with a generally ring-shaped form at the outer side of said cell passage area A:

wherein said cell passage area A contains cell passages formed by said wall face portions of said walls formed having an undulated shape;

and wherein said cell passage area B comprises cell passages formed by said wall face portions of said walls formed having a flat shape;

and wherein the thickness of the walls of the cell passages within said cell passage area B is greater than the thickness of the walls of the cell passages within said cell passage area A, and also wherein the thickness thereof
5 increases in stages from the inner circumference portion toward the outer portion portion or only increases in stages near the boundary between area B and area A.

10 10. An undulated-wall honeycomb structure according to ~~any of the Claims 1 through 9~~ Claim 1, wherein the material thereof is one or a composition of a plurality of the following group of ceramic materials: cordierite, alumina, mullite, lithium aluminum silicate, aluminum titanate, titania, zirconia, silicone nitride, aluminum
15 nitride, and silicon carbide; or one of the following group: stainless steel, aluminum alloy; or an adsorbent of either activated charcoal or silica gel or zeolite.

20 11. An undulated-wall honeycomb structure according to Claim 10, wherein the porosity of the material used is between 45% to 80%.

25 12. A fine particle removing filter using the undulated-wall honeycomb structure according to Claim 11, comprising filtering layers of walls partitioning the cell

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passages, by plugging one end of particular cell passages of said undulated-wall honeycomb structure and also plugging the other end of the remaining cell passages.

5 13. A fine particle removing filter according to Claim 12 wherein the surface roughness of the undulated walls of said undulated-wall honeycomb structure is 10% or more in Valley Level.

10 14. A fine particle removing filter according to Claim 12 wherein the wall thickness of said undulated-wall honeycomb structure is around 0.2 to 1.2 mm.

15 15. A fine particle removing filter according to Claim 12 wherein the cell density of said undulated-wall honeycomb structure is around 50 to 600 cpsi (cells per square centimeter).

20 16. An undulated-wall honeycomb structure according to ~~any one of the Claims 1 through 13~~ Claim 1, which is used as an exhaust gas purification catalyst carrier for vehicles, and carries catalyst on the surface on the cell wall face and/or in micropores within the walls of said honeycomb structure.

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catalytic converters being serially alternately arrayed.

22. An exhaust gas purification catalytic converter system, wherein the exhaust gas purification catalytic converter according to ~~Claim 19 of the undulated-wall~~ honeycomb structure having a plurality of cell passages which are mutually parallel in channel direction; wherein intersection portions between walls partitioning said cell passages are formed so as to maintain a predetermined angle at cross-sections perpendicular to said cell passage and positioned systematically, and wherein the wall face portions of said walls excluding said intersection portions are formed so as to have an undulated shape in both the cell passage direction and the cross-sectional direction perpendicular to said cell passage direction, is placed to the upstream side of the exhaust, and the fine particle removing filter according to Claim 12 or a fine particle removing filter comprising a normal flat-wall honeycomb structure is placed to the downstream side of the exhaust.

23. An exhaust gas purification catalytic converter system according to Claim 22, wherein each of said fine particle removing filters is a readily-exchangeable cartridge type.

24. An exhaust gas purification system using the undulated-wall honeycomb structure according to Claim 16, for capturing fine particle substances in the exhaust gas, said exhaust gas purification system comprising:

5 means for charging said undulated-wall honeycomb structure and electrically capturing said fine particle substances.

10 25. An exhaust gas purification system using the undulated-wall honeycomb structure according to Claim 16, for capturing fine particle substances in the exhaust gas, said exhaust gas purification system using non-thermal equilibrium plasma (non-thermal plasma) or microwave discharge plasma.

15 26. A fuel tank evaporation system using the undulated-wall honeycomb structure according to Claim 16, for suppressing external leakage of volatile components of fuel.

20 27. An exhaust gas purification system according to ~~either Claim 24 or 25~~ Claim 24, wherein said undulated-wall honeycomb structure is a readily exchangeable cartridge type configuration.

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28. A fuel cell system component using the undulated-wall honeycomb structure according to Claim 16.

29. A sandwich panel using the undulated-wall
5 honeycomb structure according to Claim 16.

30. A method for manufacturing an undulated-wall honeycomb structure, wherein a back plate having adjacent through holes with differing material flow resistance is
10 used as a nozzle material for extrusion forming.

31. A method for manufacturing an undulated-wall honeycomb structure according to ~~Claim 30~~ Claim 31, wherein
15 said back plate changes in thickness from the outer portion toward the center portion.

32. A method for manufacturing an undulated-wall honeycomb structure according to ~~either Claim 30 or 31~~ Claim 31, wherein said back plate has through holes A and through
20 holes B with differing hole diameters.

33. A method for manufacturing an undulated-wall honeycomb structure, wherein undulations are formed in metal foil by plasticity working beforehand, and said metal foil
25 is wrapped in a corrugated manner, thereby forming a metal

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